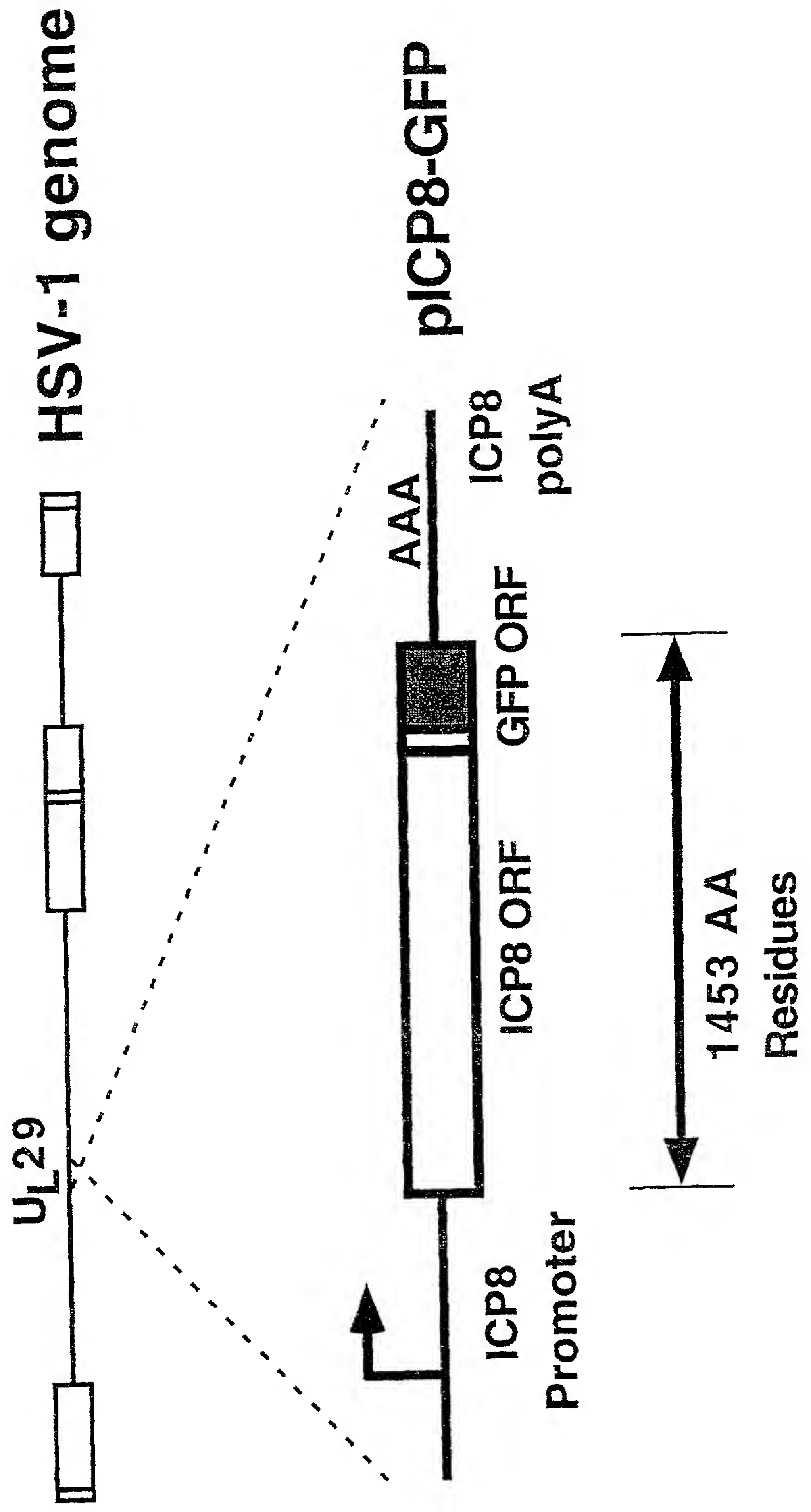

HSV-1 genome
U_L29
pICP8-GFP
ICP8 polyA
AAA
GFP ORF
ICP8 ORF
1453 AA Residues
ICP8 Promoter

FIG. 1

VIRUS	MOI	YIELD (PFU//ML)[a]	
		VERO	S2
ICP8-GFP	3	9.8×10^4	1.5×10^8
KOS 1.1	3	8.8×10^8	8.5×10^8
ICP8-GFP	20	4.6×10^5	6.6×10^7
KOS 1.1	20	6.8×10^8	7.7×10^8

[a] Determined by plaque assay on S2 cells

FIG. 2

FIG. 3A

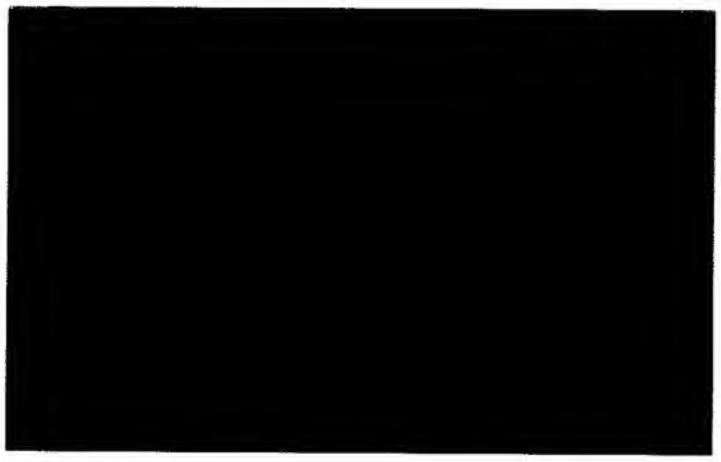


FIG. 3B

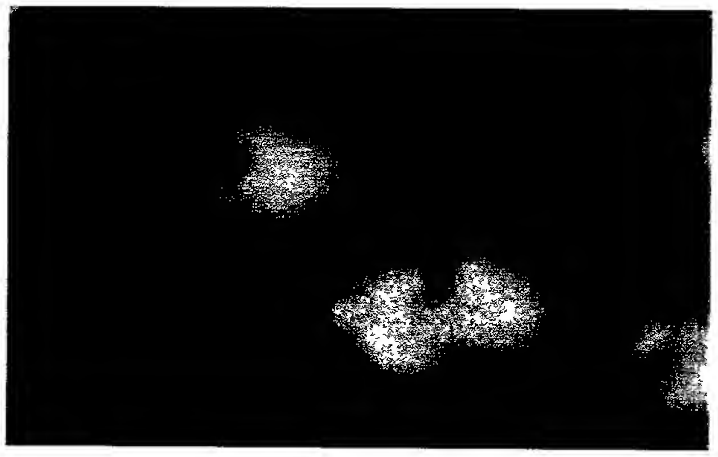


FIG. 3C

FIG. 4A

FIG. 4B

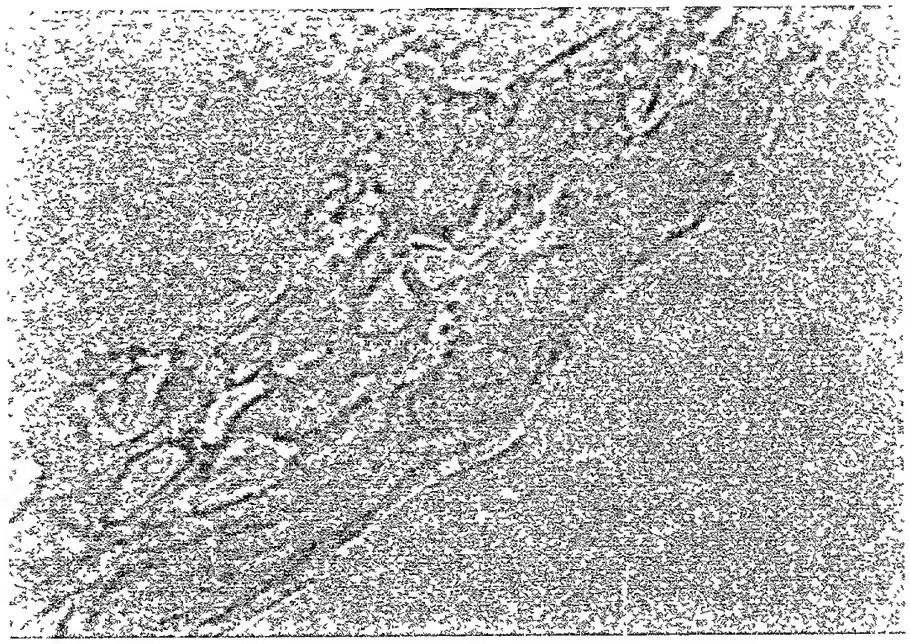


FIG. 5A

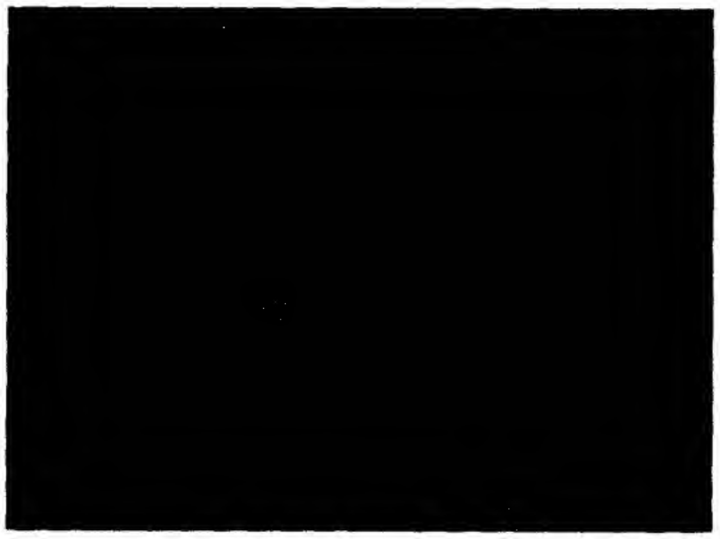


FIG. 5B

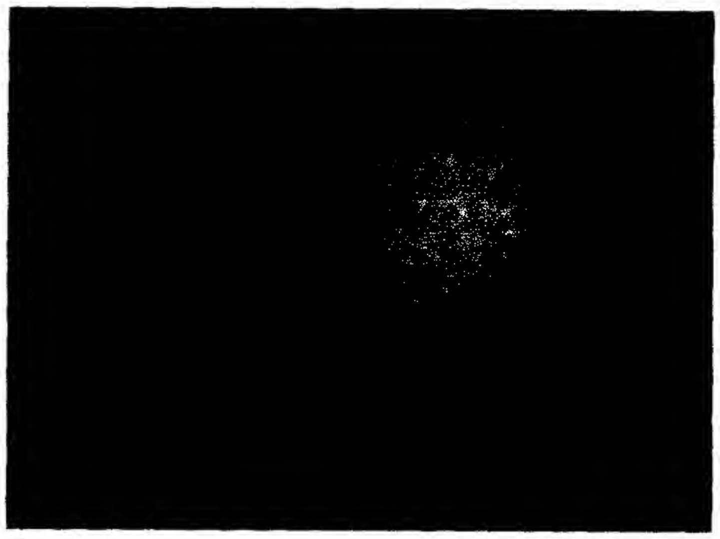
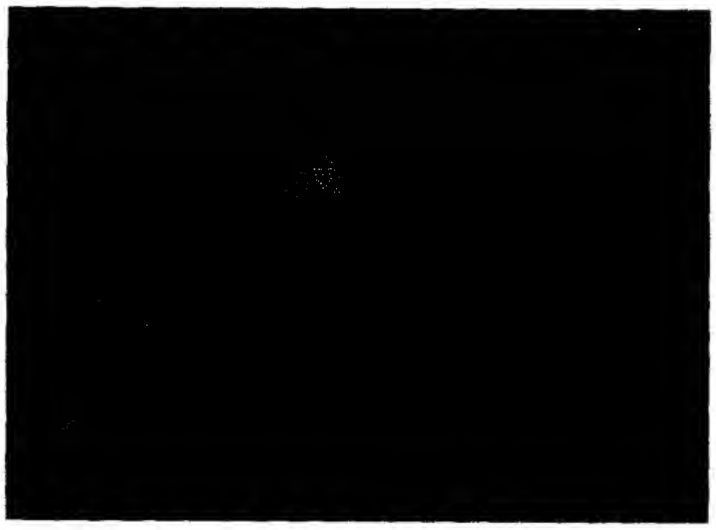


FIG. 5C

FIG. 5D



atg gag aca aag ccc aag acg gca acc acc atc aag gtc ccc ccc ggg 48
ccc ctg gga tac gtg tac gct cgc gcg tgt ccg tcc gaa ggc atc gag 96
ctt ctg gcg tta ctg tcg gcg cgc agc ggc gat gcc gac gtc gcc gtg 144
gcg ccc ctg gtc gtg ggc ctg acc gtg gag agc ggc ttt gag gcc aac 192
gta gcc gtg gtc gtg ggt tct cgc acg acg ggg ctc ggg ggt acc gcg 240
gtg tcc ctg aaa ctg acg cca tcg cac tac agc tcg tcc gtg tac gtc 288
ttt cac ggc ggc cgg cac ctg gac ccc agc acc cag gcc cca aac ctg 336
acg cga ctc tgc gag cgg gca cgc cgc cat ttt ggc ttt tcg gac tac 384
acc ccc cgg ccc ggc gac ctc aaa cac gag acg acg ggg gag gcg ctg 432
tgt gag cgc ctc ggc ctg gac ccg gac cgc gcc ctc ctg tat ctg gtc 480
gtt acc gag ggc ttc aag gag gcc gtg tgc atc aac aac acc ttt ctg 528
cac ctg gga ggc tcg gac aag gta acc ata ggc ggg gcg gag gtg cac 576
cgc ata ccc gtg tat ccg ttg cag ctg ttc atg ccg gat ttt agc cgg 624
gtc atc gcc gag ccg ttc aac gcc aac cac cga tcg atc ggg gag aat 672
ttt acc tac ccg ctt ccg ttt ttt aac cgc ccc ctc aac cgc ctc ctg 720
ttc gag gcg gtc gtg gga ccc gcc gcc gtg gca ctg cga tgc cga aac 768
gtg gac gcc gtg gcc cgc gcg gcc gcc cac ctg gcg ttt gac gaa aac 816
cac gag ggc gcc gcc ctc ccc gcc gac att acg ttc acg gcc ttc gaa 864
gcc agc cag ggt aag acc ccg cgg ggt ggg cgc gac ggc ggc ggc aag 912
ggc ccg gcg ggc ggg ttc gaa cag cgc ctg gcc tcc gtc atg gcc gga 960
gac gcc gcc ctg gcc ctc gag tct atc gtg tcg atg gcc gtc ttc gac 1008
gag ccg ccc acc gac atc tcc gcg tgg ccg ctg tgc gag ggc cag gac 1056
acg gcc gcg gcc cgc gcc aac gcc gtc ggg gcg tac ctg gcg cgc gcc 1104
gcg gga ctc gtg ggg gcc atg gta ttt agc acc aac tcg gcc ctc cat 1152
ctc acc gag gtg gac gac gcc ggt ccg gcg gac cca aag gac cac agc 1200
aaa ccc tcc ttt tac cgc ttc ttc ctc gtg ccc ggg acc cac gtg gcg 1248
gcc aac cca cag gtg gac cgc gag gga cac gtg gtg ccc ggg ttc gag 1296
ggt cgg ccc acc gcg ccc ctc gtc ggc gga acc cag gaa ttt gcc ggc 1344
gag cac ctg gcc atg ctg tgt ggg ttt tcc ccg gcg ctg ctg gcc aag 1392
atg ctg ttt tac ctg gag cgc tgc gac ggc ggc gtg atc gtc ggg cgc 1440

FIG. 6A

cag gag atg gac gtg ttt cga tac gtc gcg gac tcc aac cag acc gac 1488

gtg ccc tgc aac ctg tgc acc ttc gac acg cgc cac gcc tgc gta cac 1536

acg acg ctc atg cgc ctc cgg gcg cgc cat ccc aag ttc gcc agc gcc 1584

gcc cgc gga gcc atc ggc gtc ttc ggg acc atg aac agc atg tac agc 1632

gac tgc gac gtg ctg gga aac tac gcc gcc ttc tcg gcc ctg aag cgc 1680

gcg gac gga tcc gag acc gcc cgg acc atc atg cag gag acg tac cgc 1728

gcg gcg acc gag cgc gtc atg gcc gaa ctc gag acc ctg cag tac gtg 1776

gac cag gcg gtc ccc acg gcc atg ggg cgg ctg gag acc atc atc acc 1824

aac cgc gag gcc ctg cat acg gtg gtg aac aac gtc agg cag gtc gtg 1872

gac cgc gag gtg gag cag ctg atg cgc aac ctg gtg gag ggg agg aac 1920

ttc aag ttt cgc gac ggt ctg ggc gag gcc aac cac gcc atg tcc ctg 1968

acg ctg gac ccg tac gcg tgc ggg cca tgc ccc ctg ctt cag ctt ctc 2016

ggg cgg cga tcc aac ctc gcc gtg tat cag gac ctg gcc ctg agc cag 2064

tgc cac ggg gtg ttc gcc ggg cag tcg gtc gag ggg cgc aac ttt cgc 2112

aat caa ttc caa ccg gtg ctg cgg cgg cgc gtg atg gac atg ttt aac 2160

aac ggg ttt ctg tcg gcc aaa acg ctg acg gtc gcg ctc tcg gag ggg 2208

gcg gct atc tgc gcc ccc agc cta acg gcc ggc cag acg gcc ccc gcc 2256

gag agc agc ttc gag ggc gac gtt gcc cgc gtg acc ctg ggg ttt ccc 2304

aag gag ctg cgc gtc aag agc cgc gtg ttg ttc gcg ggc gcg agc gcc 2352

aac gcg tcc gag gcc gcc aag gcg cgg gtc gcc agc ctc cag agc gcc 2400

tac cag aag ccc gac aag cgc gtg gac atc ctc ctc gga ccg ctg ggc 2448

ttt ctg ctg aag cag ttc cac gcg gcc atc ttc ccc aac ggc aag ccc 2496

ccg ggg tcc aac cag ccg aac ccg cag tgg ttc tgg acg gcc ctc caa 2544

cgc aac cag ctt ccc gcc cgg ctc ctg tcg cgc gag gac atc gag acc 2592

atc gcg ttc att aaa aag ttt tcc ctg gac tac ggc gcg ata aac ttt 2640

att aac ctg gcc ccc aac aac gtg agc gag ctg gcg atg tac tac atg 2688

gca aac cag att ctg cgg tac tgc gat cac tcg aca tac ttc atc aac 2736

acc ctc acg gcc atc atc gcg ggg tcc cgc cgt ccc ccc agc gtg cag 2784

gcg gcg gcc gcg tgg tcc gcg cag ggc ggg gcg ggc ctg gag gcc ggg 2832

gcc cgc gcg ctg atg gac gcc gtg gac gcg cat ccg ggc gcg tgg acg 2880

tcc atg ttc gcc agc tgc aac ctg ctg cgg ccc gtc atg gcg gcg cgc 2928

FIG. 6B

ccc atg gtc gtg ttg ggg ttg agc atc agc aaa tac tac ggc atg gcc 2976

ggc aac gac cgt gtg ttt cag gcc ggg aac tgg gcc agc ctg atg ggc 3024

ggc aaa aac gcg tgc ccg ctc ctt att ttt gac cgc acc cgc aag ttc 3072

gtc ctg gcc tgt ccc cgg gcc ggg ttt gtg tgc gcg gcc tcg aac ctc 3120

ggc ggc gga gcg cac gaa agc tcg ctg tgc gag cag ctc cgg ggc att 3168

atc tcc gag ggc ggg gcg gcc gtc gcc agt agc gtg ttc gtg gcg acc 3216

gtg aaa agc ctg ggg ccc cgc acc cag cag ctg cag atc gag gac tgg 3264

ctg gcg ctc ctg gag gac gag tac cta agc gag gag atg atg gag ctg 3312

acc gcg cgt gcc ctg gag cgc ggc aac ggc gag tgg tcg acg gac gcg 3360

gcc ctg gag gtg gcg cac gag gcc gag gcc cta gtc agc caa ctc ggc 3408

aac gcc ggg gag gtg ttt aac ttt ggg gat ttt ggc tgc gag gac gac 3456

aac gcg acg ccg ttc ggc ggc ccg ggg gcc ccg gga ccg gca ttt gcc 3504

ggc cgc aaa cgg gcg ttc cac ggg gat gac ccg ttt ggg gag ggg ccc 3552

ccc gac aaa aag gga gac ctg acg ttg gat atg ctg aga ggg gtt ggg 3600

ggg tgg ggg aac cta gag tcg acc cgg gcg gcc gcc gcc acc atg agc 3648

aag ggc gag gaa ctg ttc act ggc gtg gtc cca att ctc gtg gaa ctg 3696

gat ggc gat gtg aat ggg cac aaa ttt tct gtc agc gga gag ggt gaa 3744

ggt gat gcc aca tac gga aag ctc acc ctg aaa ttc atc tgc acc act 3792

gga aag ctc cct gtg cca tgg cca aca ctg gtc act acc ttc acc tat 3840

ggc gtg cag tgc ttt tcc aga tac cca gac cat atg aag cag cat gac 3888

ttt ttc aag agc gcc atg ccc gag ggc tat gtg cag gag aga acc atc 3936

ttt ttc aaa gat gac ggg aac tac aag acc cgc gct gaa gtc aag ttc 3984

gaa ggt gac acc ctg gtg aat aga atc gag ttg aag ggc att gac ttt 4032

aag gaa gat gga aac att ctc ggc cac aag ctg gaa tac aac tat aac 4080

tcc cac aat gtg tac atc atg gcc gac aag caa aag aat ggc atc aag 4128

gtc aac ttc aag atc aga cac aac att gag gat gga tcc gtg cag ctg 4176

gcc gac cat tat caa cag aac act cca atc ggc gac ggc cct gtg ctc 4224

ctc cca gac aac cat tac ctg tcc acc cag tct gcc ctg tct aaa gat 4272

ccc aac gaa aag aga gac cac atg gtc ctg ctg gag ttt gtg acc gct 4320

gct ggg atc aca cat ggc atg gac gag ctg tac aag tga 4359

FIG. 6C

```
Met Glu Thr Lys Pro Lys Thr Ala Thr Thr Ile Lys Val Pro Pro Gly
1               5                   10                  15
Pro Leu Gly Tyr Val Tyr Ala Arg Ala Cys Pro Ser Glu Gly Ile Glu
            20                  25                  30
Leu Leu Ala Leu Leu Ser Ala Arg Ser Gly Asp Ala Asp Val Ala Val
        35                  40                  45
Ala Pro Leu Val Val Gly Leu Thr Val Glu Ser Gly Phe Glu Ala Asn
    50                  55                  60
Val Ala Val Val Val Gly Ser Arg Thr Thr Gly Leu Gly Gly Thr Ala
65                  70                  75                  80
Val Ser Leu Lys Leu Thr Pro Ser His Tyr Ser Ser Ser Val Tyr Val
                85                  90                  95
Phe His Gly Gly Arg His Leu Asp Pro Ser Thr Gln Ala Pro Asn Leu
            100                 105                 110
Thr Arg Leu Cys Glu Arg Ala Arg Arg His Phe Gly Phe Ser Asp Tyr
        115                 120                 125
Thr Pro Arg Pro Gly Asp Leu Lys His Glu Thr Thr Gly Glu Ala Leu
    130                 135                 140
Cys Glu Arg Leu Gly Leu Asp Pro Asp Arg Ala Leu Leu Tyr Leu Val
145                 150                 155                 160
Val Thr Glu Gly Phe Lys Glu Ala Val Cys Ile Asn Asn Thr Phe Leu
                165                 170                 175
His Leu Gly Gly Ser Asp Lys Val Thr Ile Gly Gly Ala Glu Val His
            180                 185                 190
Arg Ile Pro Val Tyr Pro Leu Gln Leu Phe Met Pro Asp Phe Ser Arg
        195                 200                 205
Val Ile Ala Glu Pro Phe Asn Ala Asn His Arg Ser Ile Gly Glu Asn
    210                 215                 220
Phe Thr Tyr Pro Leu Pro Phe Phe Asn Arg Pro Leu Asn Arg Leu Leu
225                 230                 235                 240
Phe Glu Ala Val Val Gly Pro Ala Ala Val Ala Leu Arg Cys Arg Asn
                245                 250                 255
Val Asp Ala Val Ala Arg Ala Ala Ala His Leu Ala Phe Asp Glu Asn
            260                 265                 270
His Glu Gly Ala Ala Leu Pro Ala Asp Ile Thr Phe Thr Ala Phe Glu
        275                 280                 285
Ala Ser Gln Gly Lys Thr Pro Arg Gly Gly Arg Asp Gly Gly Gly Lys
    290                 295                 300
Gly Pro Ala Gly Gly Phe Glu Gln Arg Leu Ala Ser Val Met Ala Gly
305                 310                 315                 320
Asp Ala Ala Leu Ala Leu Glu Ser Ile Val Ser Met Ala Val Phe Asp
                325                 330                 335
Glu Pro Pro Thr Asp Ile Ser Ala Trp Pro Leu Cys Glu Gly Gln Asp
            340                 345                 350
Thr Ala Ala Ala Arg Ala Asn Ala Val Gly Ala Tyr Leu Ala Arg Ala
        355                 360                 365
Ala Gly Leu Val Gly Ala Met Val Phe Ser Thr Asn Ser Ala Leu His
    370                 375                 380
Leu Thr Glu Val Asp Asp Ala Gly Pro Ala Asp Pro Lys Asp His Ser
385                 390                 395                 400
Lys Pro Ser Phe Tyr Arg Phe Phe Leu Val Pro Gly Thr His Val Ala
                405                 410                 415
```

FIG. 7A

```
Ala Asn Pro Gln Val Asp Arg Glu Gly His Val Val Pro Gly Phe Glu
            420                 425                 430
Gly Arg Pro Thr Ala Pro Leu Val Gly Gly Thr Gln Glu Phe Ala Gly
        435                 440                 445
Glu His Leu Ala Met Leu Cys Gly Phe Ser Pro Ala Leu Leu Ala Lys
    450                 455                 460
Met Leu Phe Tyr Leu Glu Arg Cys Asp Gly Gly Val Ile Val Gly Arg
465                 470                 475                 480
Gln Glu Met Asp Val Phe Arg Tyr Val Ala Asp Ser Asn Gln Thr Asp
                485                 490                 495
Val Pro Cys Asn Leu Cys Thr Phe Asp Thr Arg His Ala Cys Val His
            500                 505                 510
Thr Thr Leu Met Arg Leu Arg Ala Arg His Pro Lys Phe Ala Ser Ala
        515                 520                 525
Ala Arg Gly Ala Ile Gly Val Phe Gly Thr Met Asn Ser Met Tyr Ser
    530                 535                 540
Asp Cys Asp Val Leu Gly Asn Tyr Ala Ala Phe Ser Ala Leu Lys Arg
545                 550                 555                 560
Ala Asp Gly Ser Glu Thr Ala Arg Thr Ile Met Gln Glu Thr Tyr Arg
                565                 570                 575
Ala Ala Thr Glu Arg Val Met Ala Glu Leu Glu Thr Leu Gln Tyr Val
            580                 585                 590
Asp Gln Ala Val Pro Thr Ala Met Gly Arg Leu Glu Thr Ile Ile Thr
        595                 600                 605
Asn Arg Glu Ala Leu His Thr Val Val Asn Asn Val Arg Gln Val Val
    610                 615                 620
Asp Arg Glu Val Glu Gln Leu Met Arg Asn Leu Val Glu Gly Arg Asn
625                 630                 635                 640
Phe Lys Phe Arg Asp Gly Leu Gly Glu Ala Asn His Ala Met Ser Leu
                645                 650                 655
Thr Leu Asp Pro Tyr Ala Cys Gly Pro Cys Pro Leu Leu Gln Leu Leu
            660                 665                 670
Gly Arg Arg Ser Asn Leu Ala Val Tyr Gln Asp Leu Ala Leu Ser Gln
        675                 680                 685
Cys His Gly Val Phe Ala Gly Gln Ser Val Glu Gly Arg Asn Phe Arg
    690                 695                 700
Asn Gln Phe Gln Pro Val Leu Arg Arg Arg Val Met Asp Met Phe Asn
705                 710                 715                 720
Asn Gly Phe Leu Ser Ala Lys Thr Leu Thr Val Ala Leu Ser Glu Gly
                725                 730                 735
Ala Ala Ile Cys Ala Pro Ser Leu Thr Ala Gly Gln Thr Ala Pro Ala
            740                 745                 750
Glu Ser Ser Phe Glu Gly Asp Val Ala Arg Val Thr Leu Gly Phe Pro
        755                 760                 765
Lys Glu Leu Arg Val Lys Ser Arg Val Leu Phe Ala Gly Ala Ser Ala
    770                 775                 780
Asn Ala Ser Glu Ala Ala Lys Ala Arg Val Ala Ser Leu Gln Ser Ala
785                 790                 795                 800
Tyr Gln Lys Pro Asp Lys Arg Val Asp Ile Leu Leu Gly Pro Leu Gly
                805                 810                 815
Phe Leu Leu Lys Gln Phe His Ala Ala Ile Phe Pro Asn Gly Lys Pro
            820                 825                 830
Pro Gly Ser Asn Gln Pro Asn Pro Gln Trp Phe Trp Thr Ala Leu Gln
        835                 840                 845
Arg Asn Gln Leu Pro Ala Arg Leu Leu Ser Arg Glu Asp Ile Glu Thr
    850                 855                 860
```

FIG. 7B

```
Ile Ala Phe Ile Lys Lys Phe Ser Leu Asp Tyr Gly Ala Ile Asn Phe
865                 870                 875                 880
Ile Asn Leu Ala Pro Asn Asn Val Ser Glu Leu Ala Met Tyr Tyr Met
                885                 890                 895
Ala Asn Gln Ile Leu Arg Tyr Cys Asp His Ser Thr Tyr Phe Ile Asn
            900                 905                 910
Thr Leu Thr Ala Ile Ile Ala Gly Ser Arg Arg Pro Pro Ser Val Gln
        915                 920                 925
Ala Ala Ala Ala Trp Ser Ala Gln Gly Gly Ala Gly Leu Glu Ala Gly
    930                 935                 940
Ala Arg Ala Leu Met Asp Ala Val Asp Ala His Pro Gly Ala Trp Thr
945                 950                 955                 960
Ser Met Phe Ala Ser Cys Asn Leu Leu Arg Pro Val Met Ala Ala Arg
                965                 970                 975
Pro Met Val Val Leu Gly Leu Ser Ile Ser Lys Tyr Tyr Gly Met Ala
            980                 985                 990
Gly Asn Asp Arg Val Phe Gln Ala Gly Asn Trp Ala Ser Leu Met Gly
        995                 1000                1005
Gly Lys Asn Ala Cys Pro Leu Leu Ile Phe Asp Arg Thr Arg Lys Phe
    1010                1015                1020
Val Leu Ala Cys Pro Arg Ala Gly Phe Val Cys Ala Ala Ser Asn Leu
1025                1030                1035                1040
Gly Gly Gly Ala His Glu Ser Ser Leu Cys Glu Gln Leu Arg Gly Ile
                1045                1050                1055
Ile Ser Glu Gly Gly Ala Ala Val Ala Ser Ser Val Phe Val Ala Thr
            1060                1065                1070
Val Lys Ser Leu Gly Pro Arg Thr Gln Gln Leu Gln Ile Glu Asp Trp
        1075                1080                1085
Leu Ala Leu Leu Glu Asp Glu Tyr Leu Ser Glu Glu Met Met Glu Leu
    1090                1095                1100
Thr Ala Arg Ala Leu Glu Arg Gly Asn Gly Glu Trp Ser Thr Asp Ala
1105                1110                1115                1120
Ala Leu Glu Val Ala His Glu Ala Glu Ala Leu Val Ser Gln Leu Gly
                1125                1130                1135
Asn Ala Gly Glu Val Phe Asn Phe Gly Asp Phe Gly Cys Glu Asp Asp
            1140                1145                1150
Asn Ala Thr Pro Phe Gly Gly Pro Gly Ala Pro Gly Pro Ala Phe Ala
        1155                1160                1165
Gly Arg Lys Arg Ala Phe His Gly Asp Asp Pro Phe Gly Glu Gly Pro
    1170                1175                1180
Pro Asp Lys Lys Gly Asp Leu Thr Leu Asp Met Leu Arg Gly Val Gly
1185                1190                1195                1200
Gly Trp Gly Asn Leu Glu Ser Thr Arg Ala Ala Ala Ala Thr Met Ser
                1205                1210                1215
Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu Val Glu Leu
            1220                1225                1230
Asp Gly Asp Val Asn Gly His Lys Phe Ser Val Ser Gly Glu Gly Glu
        1235                1240                1245
Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile Cys Thr Thr
    1250                1255                1260
Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr Phe Thr Tyr
1265                1270                1275                1280
Gly Val Gln Cys Phe Ser Arg Tyr Pro Asp His Met Lys Gln His Asp
                1285                1290                1295
Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu Arg Thr Ile
            1300                1305                1310
Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu Val Lys Phe
        1315                1320                1325
```

FIG. 7C

```
Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly Ile Asp Phe
    1330                1335                1340
Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr Asn Tyr Asn
1345                1350                1355                1360
Ser His Asn Val Tyr Ile Met Ala Asp Lys Gln Lys Asn Gly Ile Lys
                1365                1370                1375
Val Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser Val Gln Leu
            1380                1385                1390
Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly Pro Val Leu
        1395                1400                1405
Leu Pro Asp Asn His Tyr Leu Ser Thr Gln Ser Ala Leu Ser Lys Asp
    1410                1415                1420
Pro Asn Glu Lys Arg Asp His Met Val Leu Leu Glu Phe Val Thr Ala
1425                1430                1435                1440
Ala Gly Ile Thr His Gly Met Asp Glu Leu Tyr Lys
                1445                1450
```

FIG. 7D